

CLAIMS

1. A chemical mechanical polishing method comprising:
loading a semiconductor wafer in a wafer carrier;
rotating the semiconductor wafer in the wafer carrier in a first direction
5 while a polished surface of the semiconductor wafer is maintained
against a polishing pad which is rotating in a second direction, the
second direction being opposite to the first direction; and
reversing the direction of rotation of one of the wafer carrier and the
polishing pad during a final polishing operation to remove
10 embedded particles from the polished surface of the semiconductor
wafer.

2. The method of claim 1 further comprising:
while reversing the direction of rotation, spraying the polishing pad with a
15 liquid to remove the particles from the polishing pad.

3. The method of claim 1 further comprising:
during a first processing phase, rotating the semiconductor wafer in the
wafer carrier in a clockwise direction and rotating the polishing pad
20 in a counter-clockwise direction for a predetermined period of time;
and
during a second processing phase, rotating the semiconductor wafer in the
wafer carrier in a counter-clockwise direction for a final polish
duration.

4. The method of claim 1 further comprising:
during a first processing phase, rotating the semiconductor wafer in the
wafer carrier in a counter-clockwise direction and rotating the
polishing pad in a clockwise direction for a predetermined period of
30 time; and

during a second processing phase, rotating the semiconductor wafer in the wafer carrier in a counter-clockwise direction for a final polish duration.

5 5. A chemical mechanical wafer polishing system comprising:
a wafer carrier configured to retain a semiconductor wafer during a
chemical mechanical polishing process;
a first drive system coupled with the wafer carrier to rotate the wafer carrier
with the semiconductor wafer in one of a first rotational direction
10 and a second, opposite, rotational direction;
a platen configured for mounting a polishing pad, the polishing pad
polishing a surface of the semiconductor wafer when the wafer
carrier and the platen are brought into proximity;
a second drive system coupled with the platen to rotate the platen and the
15 polishing pad in one of the first rotational direction and the second
rotational direction; and
a control system coupled with the first drive system and the second system
to rotate the semiconductor wafer and the polishing pads in opposite
20 directions during a first polishing interval and to reverse rotation of
the semiconductor wafer relative to the polishing pad during a
second polishing interval to remove embedded particles from the
surface of the semiconductor wafer.

25 6. The chemical mechanical wafer polishing system of claim 5 further
comprising:
a high pressure liquid spray system adjacent the polishing pad and
positioned to spray liquid on the polishing pad to remove particles
from the polishing pad.

30 7. A chemical mechanical wafer polishing (CMP) system comprising:

wafer rotation means for rotating a semiconductor wafer in one of a first direction and a second direction in the CMP system;

a polishing pad to polish a surface of the semiconductor wafer;

pad rotation means for rotating the polishing pad relative to the rotation of the semiconductor wafer to produce chemical mechanical polishing of the surface of the semiconductor wafer; and

control means for controlling at least one of the wafer rotation means and the pad rotation means, the control means producing a first relative rotation during a first polishing duration and producing an opposite relative rotation during a second polishing duration.

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